WLPCS
Geometry

Name: _____ Date: _____ Per.: _____

1.5 Angles and Solar Power – Group Task

PART I: Read "Carbon, Carbon Everywhere!" and answer the following questions individually. When all group members are complete, compare and discuss answers.

1. What is a carbon footprint?

2. What are the two biggest components of your carbon footprint? What are examples of these in YOUR daily life?

3. What happens when fossil fuels are burned? How can this be dangerous?

4. How can you shrink your carbon footprint?

Score: ____/5

PART II: As a group, complete "What's Your Angle?" (record answers on a separate piece of paper).

Make sure you are working AS A GROUP! Everyone is responsible for understanding all parts!

Suggestions:

***Have one person read each question as the rest of the group follows along.**

***If you are confused, take a risk and ask someone in your group.**

***See a group member that is acting a bit confused? Ask if he/she has a question!**

ONLY COMPLETE THE CIRCLED QUESTIONS!

Score: _____/13

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PART III: Reflect.

1. Why are angles important when installing solar panels? Fill in the blanks using the word bank below:

90	steeper	tilt angles
tilted	latitudes	less steep

Angles are important when installing solar panels because different _____

will require the panels to have different _____ from the ground.

The ideal angle for the sun's rays to hit the solar panels is _____ degrees. Living in Washington,

DC, the sun is lower in the sky in winter so the panels will need to be _____

at a _____ angle. If you live on the equation, your panels will need

to be tilted at a _____ angle.

2. What are possible advantages to using solar energy? What are possible disadvantages?

Score: _____/6

PART I

Carbon, Carbon Everywhere!

We know that greenhouse gas emissions such as carbon dioxide are a major contributor to climate change. So how can we evaluate our contributions to climate change and greenhouse gas emissions?

A carbon footprint is one way to measure your impact on the climate. It gives you an idea of the amount of greenhouse gases your activities produce. It is often measured in pounds of carbon dioxide (CO_2) emissions. We call it a footprint because it's like the mark you leave on the earth as you go about your daily activities. When you walk on a sandy beach, you leave behind a footprint. When you do an activity or use an item that produces greenhouse gases, you leave behind a carbon footprint.

Parts of a Footprint

Two major components of your footprint are electricity and transportation. We need energy for all of our daily activities, but electricity and transportation require the largest amounts of energy.

Think about a few of the things you do every morning. You may turn off your alarm clock, turn on a lamp, or take a hot shower. All of those things require electricity. In many places, our electricity comes from burning fossil fuels such as coal, natural gas, propane, or heating oil. When they are burned to produce energy, fossil fuels emit greenhouse gases. Greenhouse gases like carbon dioxide warm the planet and are released every time we use electricity that was created by burning fossil fuels. This warming is dangerous and could lead to severe flooding, biodiversity loss, glacial melting, and other serious consequences.[1]

Many of our daily activities also require transportation. You might ride in a car or bus to get to school. That requires petroleum oil, a fossil fuel used to make gasoline and diesel. Most of the things we buy also require transportation at various stages, including transportation of raw materials to a factory and transportation of finished goods to a store.

"The future depends on what we do in the present."

—Mahatma Gandhi, former political and spiritual leader of India

As you're beginning to see, greenhouse gases are emitted all the time! By becoming aware of the impacts of your daily activities, you can better choose how large or small your carbon footprint will be.

Shrinking Your Footprint

Here are some simple ways to reduce your carbon emissions:

- Turn off lights, appliances, and electronics when you're not using them.
- Travel on foot, by bicycle, or on public transportation when you can.
- Eat fewer processed foods and less meat.
- Buy used items instead of new.
- Recycle aluminum cans, plastic bottles, and paper.
- Plant trees and other plants that absorb CO_2.

Shrinking your carbon footprint doesn't need to be painful—you're not just giving things up, you're getting a lot, too. By helping to stop climate change, you are working to improve the quality of life for yourself and for the world!

1 Science Daily, "Even if Greenhouse Gas Emissions Hold Steady, Warmer World Faces Loss of Biodiversity, Glaciers," September 17, 2008, www.sciencedaily.com/releases/2008/09/080917145509.htm.

1.5 GROUP TASK: ANGLES AND SOLAR POWER

PART II

Name Date

What's Your Angle?, page 1

Objectives

- Determine missing angle measurements of a triangle
- Classify angles and triangles as acute, obtuse, or right
- Identify supplementary angles
- ~~Use the Pythagorean theorem to calculate the length of a missing side of a right triangle~~
- ~~Use trigonometric ratios to determine the length of a missing side of a triangle~~
- Explore solar power as a form of renewable energy

Investigations

1. What kinds of places do you think would be best for using solar energy (energy from the sun)?

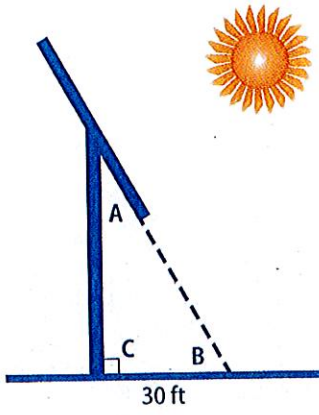
2. Solar panels consist of photovoltaic cells, which are devices that turn the sun's energy into electricity. In order to get the most energy from the sun that you possibly can, you need to position solar panels at a particular angle. The goal is for the sun to hit the panel perpendicularly.

To calculate the optimal angle at which to tilt your solar panel from the horizon, multiply your latitude by 0.9 and add 29 degrees.[1] Find the optimum angle of tilt for the following latitudes, using the formula just given.

Latitude	Angle
5°	33.5°
20°	
35°	
50°	
65°	

← 0.9(5) + 29

3. The following solar panel is to be installed at 35° latitude using a pole mount. The configuration looks like the following drawing. Angle B is the angle that you calculated for 35° latitude. Find the measure of Angle A.



★ sum of angles inside a triangle is 180° ★

4. Is m∠B acute, right, or obtuse?

5. What angle measurement is the supplement to ∠B?

Name Date

What's Your Angle?, page 2

6. Is △ABC acute, right, or obtuse?

7. If this solar panel was to be installed at 65° latitude, would that make m∠A larger or smaller than it was in problem #3?

8. Why do you think solar panels in the Northern Hemisphere are oriented to face south?

9. Use a trigonometric ratio to find the height of the pole from ∠B. Round your answer, in degrees, to the nearest tenths place.

10. Use the Pythagorean theorem to find the hypotenuse of △ABC. Round your answer, in feet, to the nearest tenth.

Bonus

How do you think the angle for tilting a solar panel from the horizon changes in summer months?